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Changes in Ventilation of the Northeast Pacific During the Last Deglaciation

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A pronounced salinity minimum extending across the North Pacific in the 500-800 m depth range is evidence of ventilation driven by vertical convection at higher latitudes. Salinity and other hydrographic tracers show that intermediate water formation today ventilates the oxygen minimum zone off California. Based on two cores from the California margin at 800 and 1,600 m depth, we argue that ventilation may have extended to greater depths in the northeast Pacific during deglaciation, hereby by-passing the oxygen minimum zone until about 10,000 years ago. The evidence includes (1) a ~ 0.2 nmol/kg increase in CdW during deglaciation recorded by Cd/Ca ratios in benthic foraminifera at 1,600 m depth with little change observed at 800 m depth, (2) a reversal in the vertical gradient of radiocarbon age differences between benthic and planktonic foraminifera relative to today suggesting enhanced ventilation at 1,600 m depth and reduced ventilation at 800 m, (3) a section of finely laminated sediments imbedded within an interval of negative $\delta^{13}\text{C}$ excursion for *U. peregrina* during the early stages of deglaciation at 800 m depth, and (4) greater salinity and temperature variability within the oxygen minimum zone towards the end of deglaciation suggested by fluctuations in the benthic oxygen isotope record. The apparent inverse relation between changes in ventilation depths of the North Pacific and the North Atlantic could reflect an increase in water vapor transport across the isthmus of Panama during deglaciation. Cd/Ca data from additional California margin cores in the 600-3,300 m range may become available before the meeting.

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